

Missouri Department of Natural Resources

## Total Maximum Daily Load Information Sheet

### Shaw Branch

---

#### Water Body Segment at a Glance:

**County:** St. Francois  
**Nearby Cities:** Elvins  
**Length of impairment:** 2 miles  
**Pollutant:** Nonvolatile Suspended Solids (NVSS) and Lead  
**Source:** Federal Abandoned Mine Land



State map showing location of watershed

**TMDL Priority Ranking:** Medium

---

#### Description of the Problem

##### Beneficial uses of Shaw Branch

- Livestock and Wildlife Watering
- Protection of Warm Water Aquatic Life
- Human Health Protection (Fish Consumption)

##### Use that is impaired

- Protection of Warm Water Aquatic Life

##### Standards that apply

- The NVSS impairment is based on exceedence of the general criteria contained in Missouri's Water Quality Standards, 10 CSR 20-7.031(3)(A), (C) and (G) where it states:
  - Waters shall be free from substances in sufficient amounts to cause the formation of putrescent, unsightly or harmful bottom deposits or prevent full maintenance of beneficial uses.
  - Waters shall be free from substances in sufficient amounts to cause unsightly color or turbidity, offensive odor or prevent full maintenance of beneficial uses.
  - Waters shall be free from physical, chemical or hydrologic changes that would impair the natural biological community.
- The Water Quality Standards for metals found in 10 CSR 20-7.031(4)(B)1 state:
  - Water contaminants shall not cause the criteria in Tables A and B to be exceeded. Concentrations of these substances in bottom sediments or waters shall not harm benthic organisms and shall not accumulate through the food chain in harmful concentrations, nor shall state and federal maximum fish tissue levels for fish consumption be exceeded.

- The numeric standards for lead are found in Table A. These standards are dependent on the hardness of the water and are expressed in dissolved form. The formulas are shown below:

$$\text{Chronic} = e^{(1.273 \cdot \ln(\text{hardness}) - 4.70479)} \cdot (1.46203 - (\ln(\text{hardness}) \cdot 0.145712)) = \mu\text{g/L}^1$$

$$\text{Acute} = e^{(1.273 \cdot \ln(\text{hardness}) - 1.460448)} \cdot (1.46203 - (\ln(\text{hardness}) \cdot 0.145712)) = \mu\text{g/L}$$

Using a hardness of 200 mg/L, the lead target for the Shaw Branch watershed (as Missouri's chronic criterion) is 5 µg/L as dissolved lead.

## Background Information

Non-Volatile Suspended Solids (NVSS) are mineral solids (like silt, sand or gravel) that are associated with soil erosion or erosion of mine-waste materials or stockpiles. When these solids get into a stream, they settle onto the bottom and smother natural substrates (materials in the streambed), aquatic invertebrate animals and fish eggs.

The impaired portion of Shaw Branch is located in the “Old Lead Belt” region of southeast Missouri. Philip Francois Renault's mining company discovered lead ore in the area as early as 1720. For more than 100 years, this area produced nearly 80 percent of the nation's mined lead. The St. Joe Lead Company acquired the site in 1864. In 1869 the use of the diamond-tipped drill allowed mining of lead ore deep underground and led to rapid development of the area. By 1900, the St. Joe Lead Company was the nation's largest lead producer due to their acquisition of smaller lead companies, including the Federal Lead Company mine site causing the impairment to Shaw Branch. In 1972, St. Joe Minerals Corporation stopped production of lead at the site. The mining complex, along with 8,000 acres of land, was donated to the state in 1976 to be used for recreational purposes. The Federal Mill Complex was developed as the Missouri Mines State Historical Site, and includes large mining equipment and mine buildings.

Letterbooks from the Federal Lead Company indicate environmental pollution was a concern prior to 1913. During the time the letterbooks were kept, 1907-1913, farmers and ranchers along Big River brought a suit against the Federal Lead Company. The suit claimed that lead pollution had harmed or destroyed crops and herds. By the ending date of the letterbooks, the suit had not been resolved.<sup>2</sup>

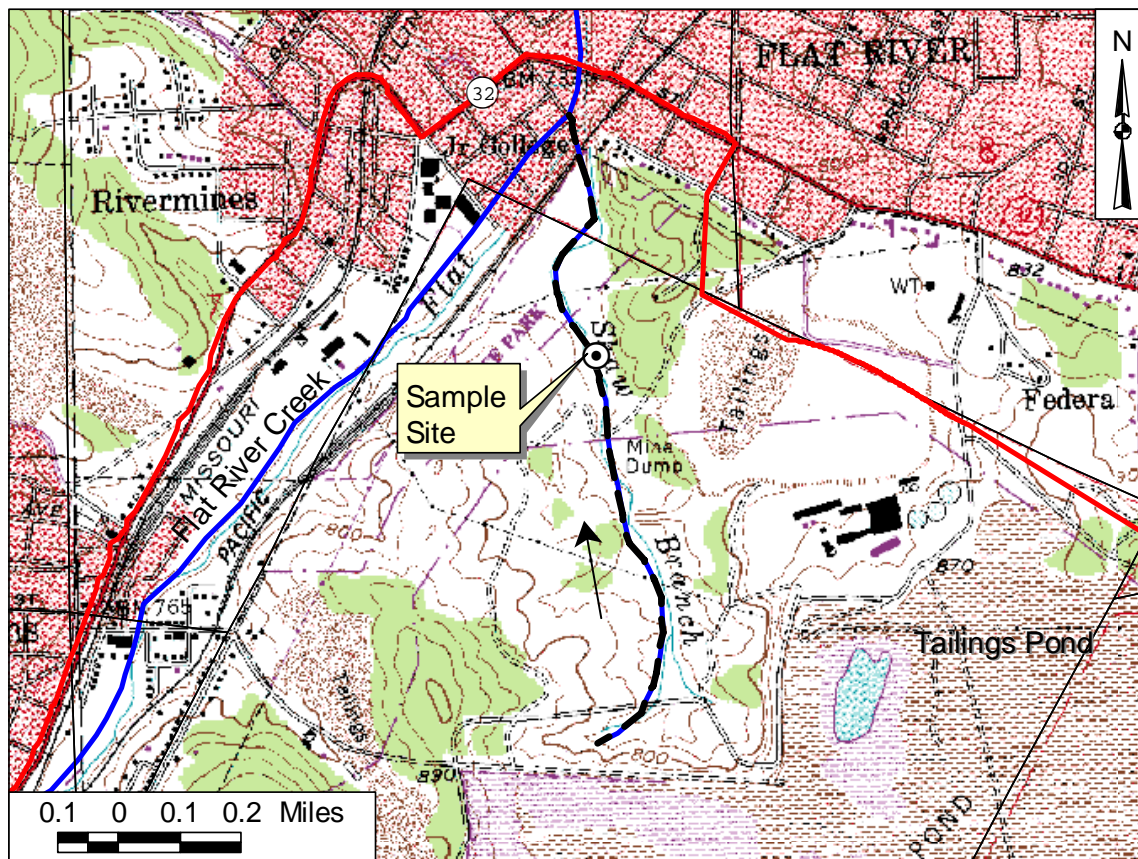
The upper mile of Shaw Branch was buried under a large tailings pond, the Federal Tailings Pond, as part of the milling operation. Subsequent erosion of tailings has occurred to the lower mile of Shaw Branch, located downstream of the tailings pond. So much sediment has been deposited in this portion of Shaw Branch that the stream channel has been almost completely buried in tailings and provides very little aquatic habitat. The map on page 3 shows only the lower mile of Shaw Branch. The upper one-mile of Shaw Branch is to the south and lies underneath the tailings pond shown at the bottom of the map.

See the [Big River and Flat River Creek](#) Information Sheet for related information.

<sup>1</sup> µg/L = micrograms per liter, or parts per billion; mg/L = milligrams per liter, or parts per million.

<sup>2</sup> University of Missouri at Rolla Web site, R520 – Federal Lead Company, Mining Dept. (Flat River, MO.), Letterbooks, 1907-1913 – Information Sheet. [www.umsr.edu/~whmcinfo/shelf21/r520/info.html](http://www.umsr.edu/~whmcinfo/shelf21/r520/info.html)

## Impaired Segment of Shaw Branch in St. Francois County, Missouri, with Sampling Site



--- Impaired Segment

→ Direction of flow

### For more information call or write:

Missouri Department of Natural Resources

Water Protection Program

P.O. Box 176, Jefferson City, MO 65102-0176

1-800-361-4827 or (573) 751-1300 office

(573) 522-9920 fax

Program Home Page: [www.dnr.mo.gov/env/wpp/index.html](http://www.dnr.mo.gov/env/wpp/index.html)